

COST-EFFECTIVENESS ANALYSIS OF STUNTING INTERVENTION THROUGH WHATSAPP APPLICATION FOR RURAL COMMUNITY EDUCATION (CASE STUDY IN BALONGCABE VILLAGE, BOJONEGORO DISTRICT)

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Abstract

Bojonegoro Regency is one of the regencies with a high prevalence of stunting at 23.9%, which is higher than the provincial prevalence of 23.5% and 21.1% nationally. Kedungadem District occupies the second highest stunting case, as many as 258 toddlers and 14 of them are in Balongcabe Village. The purpose of this study was to analyze the cost-effectiveness of stunting intervention through a public education program called Hotline Stunting that utilizes the automatic message feature on the WhatsApp Business application for the people of Balongcabe Village, Bojonegoro Regency. This research method was true-experimental by providing a stunting intervention program and the research subjects were Balongcabe village cadres. During the program's trial period in August 2021, there were 144 children under five in Balongcabe Village. The cost analysis method used Cost Effectiveness Analysis (CEA) by calculating the ratio of the total costs incurred to implement the program with program cost effectiveness that produced the same outcome, namely stunting prevention. Based on the results of the CEA calculation, the use of the Hotline Stunting program in Balongcabe Village was 4,314 rupiah and the USE Questionnaire calculation was 85.43%, indicating that the Hotline Stunting Program that utilizes the WhatsApp Business Application with a low amount will be effectively run as one stunting prevention program and categorized into a program that is very feasible and easy to use, so it can be recommended to continue to be developed in Balongcabe Village.

Keywords: Cost Effectiveness Analysis, Educating Caregivers, Intervention; Stunting

Introduction

Sustainable Development Goals (SDGs) is an agreement made by UN members in 2000 and ends in 2015 related to sustainable development based on human rights and equality with the aim of promoting change, environment, social and economic development ⁽¹⁾. SDGs is also a continuation program of the Millennium Development Goals (MDGs) program, where Indonesia is one of the countries participating in the planning and implementation of the goals and objectives of the SDGs in order to realize a better life for Indonesia. In its implementation, Indonesia has succeeded in realizing some of the goals and objectives of the SDGs, but not all of the results can be felt by the community. There are still many problems that arise in society and until now one of the problems that still occurs is the problem of poverty which causes hunger and malnutrition, one of which is stunting.

Stunting is a non-communicable disease that generally occurs in children aged 2 years. According to TNP2K (2017), stunting is a condition of poor growth that occurs in infants under five

years old (toddlers) and is caused by chronic malnutrition which results in the body condition of toddlers not in accordance with toddlers of their age (short). Malnutrition in toddlers can occur since the first 1000 days of birth (HPK) which can be caused by insufficient nutritional intake of pregnant women, pregnant women with anemia, eating malnutrition in toddlers and others, where stunting conditions only show differences after 2 years of age ⁽²⁾.

According to Ministry of Health (2021) ⁽³⁾, the target prevalence of stunting in 2020 is 5,543,000 toddlers, which is 24.1% and will decrease to 14% in 2024 ⁽⁴⁾. The prevalence of stunting in the last 3 years has decreased, decreasing from 27.7% in 2019 ⁽⁵⁾ to 24.4% in 2021 ⁽⁶⁾. However, stunting is still a public nutrition problem in Indonesia, with 27 out of 34 provinces in Indonesia categorized as chronically acute ⁽⁶⁾ because the prevalence of stunted cases (TB/U) is still above 20% ⁽⁷⁾. It can be seen that the percentage of indicators of stunted toddlers still tends to be high from the set target. Innovative efforts to prevent stunting in order to achieve the target of 14% (RPJMN target) are needed by conducting appropriate interventions, in order to reduce 2.7% of stunted toddlers each year ⁽⁶⁾.

Bojonegoro Regency is one of the districts with a high prevalence of stunting at 23.9% which is higher than the provincial prevalence of 23.5% ⁽⁶⁾ and higher than the 2021 national prevalence target of 21.1% ⁽⁸⁾. This is the main focus of the government in eradicating stunting in East Java, especially in Bojonegoro. Based on the results of the Indonesian Nutrition Status Study/SSGI (2021), it is known that as many as 23.9% of toddlers with stunted, as many as 9.5% of toddlers with wasted and as many as 19.2% of underweight toddlers are spread throughout the Bojonegoro area. Of the 36 sub-districts in Bojonegoro Regency, Kedungadem Sub-district has the second highest stunting cases after Balen Sub-district, which is 258 toddlers out of 3600 toddlers who are stunted ⁽⁹⁾. Based on primary data obtained from the Balongcabe village midwife, it can be seen that in the 2020-2021 period in Balongcabe Village there were no cases of MMR and IMR, but stunting cases were still very high, namely 258 cases in Kedungadem Subdistrict and 14 of them were in Balongcabe Village. From this data, it can be seen that nutritional health problems in Kedungadem Sub-district in particular and in Bojonegoro District in general, the problem of stunting is still relatively high.

Stunting can affect the mortality rate of children under five each year ⁽¹⁰⁾. In addition, stunting can also affect the level of intelligence of toddlers who are less than optimal, toddlers become more vulnerable to disease and are at risk of decreasing productivity levels in the future ⁽¹¹⁾. Efforts to prevent and control stunting in Bojonegoro are very important to do, especially during the COVID-19 pandemic. During this pandemic, mothers of toddlers through the intermediary of village cadres are still able to prevent and control stunting from home by utilizing the WhatsApp application. The selection of WhatsApp as the application used for stunting intervention media has adjusted the background and conditions of the Balongcabe Village network capability. In addition, this was done to limit the crowd and prevent virus transmission during a pandemic, so that later the stunting prevention program could still be implemented. Therefore, the purpose of this research is to analyze the cost-effectiveness of stunting intervention through WhatsApp to educate rural communities in Balongcabe Village, Bojonegoro Regency.

Methods

This research was a true experimental method conducted in Balongcabe Village, Bojonegoro Regency during July-August 2021. Researchers collaborated with 9 village cadres in the village who were also research subjects to develop a two-way communication system for stunting prevention education using the automatic messaging feature in the WhatsApp Business application. Researchers recorded all costs from the perspective of the village cadres incurred and activities carried out during the development, testing, and launch of this communication system through interviews. All costs were

calculated in rupiah in 2024. This study did not calculate the usage costs incurred by the community, but only identified the usage costs from the cadres' perspective. The method chosen and used in the cost analysis in this study is Cost Effectiveness Analysis (CEA), which is to calculate the ratio of the total costs incurred to implement the program to the cost effectiveness of the program that produces the same outcome ⁽¹²⁾.

The output of this research was the feasibility and ease of use of the intervention program that has been created and measured using a USE Questionnaire consisting of 30 statements with 4 aspects namely Usefulness, Ease of Use, Ease of Learning and Satisfaction filled in by village cadres using a Likert scale with a score of 1 to 7. Scale 1 for the category strongly disagree to scale 7 for the category strongly agree, then summed from each answer to get an average of all aspects and know the category of assessment results. Since the purpose of developing this communication system is to reach the public, the measure of effectiveness used is the number of people who interact (the number who reply to messages) on this application which is also the outcome of the research. The estimation of educational effectiveness was calculated based on access data of WhatsApp usage in the pilot group.

Results and Discussion

Hotline Stunting is a two-way communication system utilizing the automatic messaging feature in the WhatsApp Business application used by village cadres to educate the community. In the process, the Hotline Stunting consists of 2 modules consisting of a module on how to use the Hotline Stunting application for admins and a MP-ASI recipe module for mothers of toddlers. The admin officer of the Hotline Stunting is held by 1 assisted village cadre who is competent in the field of technology. Admins can update the material by filling in and adding material to column A (as an information code) and column B (as an explanation / content of code A) in Google Sheets which is the default application for using WhatsApp Business. The admin uses WhatsApp Business to make it easier to convey information about stunting automatically outside of working hours. In the guidebook for using the Hotline Stunting application, it is explained that admin officers can develop new material/information regularly, where admin officers will send the latest information related to health problems that occur in Balongcabe Village. If there is a question from the user community, the admin can immediately respond by replying to the message from the user. To be able to use this, the user community needs to have an active WhatsApp account and can be used for communication. Because it focuses on stunting prevention, village cadres focus on using this Hotline Stunting to reach parents or caregivers of toddlers in Balongcabe Village. It was noted that during the trial period in August there were 144 children under five in Balongcabe Village.

The program cost analysis was conducted using the cadres' perspective through interviews by recording each alternative stunting prevention activity with the Balongcabe Puskesmas Nutritionist, Balongcabe Village Midwife and Balongcabe Village Cadres. From the results of these interviews, the resources used in each alternative intervention activity were identified and categorized based on the cost structure. The total costs analyzed included fixed costs and variable costs. Fixed costs include smartphone, active phone number, WhatsApp Business application, account (email) and Google Spreadsheet, Canva application, general costs (electricity and others). Variable costs include application usage manuals, posters, leaflets and internet credit/data packages.

In accordance with the identification and cost analysis (starting from the development, trial and launch stages), the activities carried out in each stage are in the program development stage starting with:

- a. Discussion with village cadres to determine the resource needs required in the process of creating a Hotline Stunting program through the Google Meet platform.

- b. Program development begins by preparing a mobile phone (in the form of a smartphone (android/iphone) that can install applications (playstore/appstore) and an active internet data package.
- c. Purchasing an active phone number for the purpose of downloading and logging in WhatsApp Business, email and Google Spreadsheet accounts.
- d. Filling in information related to stunting on Google Sheets and synchronizing on WhatsApp Business to connect the updated data. Some of the information included includes general information such as the definition of stunting, characteristics of stunting, causes of stunting, impacts of stunting, parenting, and stunting myths. Also related to self-intervention includes how to check the nutritional status of toddlers, how to prevent and treat stunting.
- e. Making modules for using the program application and MP-ASI recipes is done using Canva Application and printed to be submitted to the admin and mothers of toddlers as support in using the program application.

The testing phase was conducted after the program development was successful. The program trial begins with:

- a. Presentation, explanation of the use of the program and discussion of the advantages and disadvantages of the program through the Google Meet platform with village cadres including the admin who will run the program. A mobile phone, an active internet data package and the WhatsApp Business application that has been installed from each village cadre is required to be able to participate in the trial activities. Of the 9 village cadres who participated in the program trial, 7 of them were able to operate the Hotline Stunting by trying to interact and trying the automatic message feature that has been set in WhatsApp Business. The feasibility and ease of use of the intervention program was then measured using a USE Questionnaire filled out by 4 village cadres present and the following results were obtained:

Table 1 USE Questionnaire Calculation Result

No	Aspects	Scores Earned	Maximum Scores	Percentages (%)
1	<i>Usefulness</i>	193	224	86,16
2	<i>Ease of Use</i>	267	308	86,69
3	<i>Ease of Learning</i>	96	112	85,71
4	<i>Satisfaction</i>	163	196	83,16
Average				85,43

Based on the table above, it can be seen that the percentage and average obtained from all aspects shows a value above 81%, namely 85.43%, which means that the Hotline Stunting program is categorized as a program that is very feasible and easy for village cadres to run.

- b. Socialization and training for village cadres to provide direction to village cadres who run the program in the village.

The launch phase of the program begins with:

- a. Delivery of modules, posters and leaflets to villages directly to village cadre representatives.
- b. Distribution of program posters and leaflets to mothers under five by village cadres together with the village midwife. This activity is a program branding activity to introduce the program to the village community in general and mothers under five specifically.
- c. Use and maintenance are included in the program launch stage. The use of the program can be done by village cadres and all villagers who have mobile phones equipped with active WhatsApp applications with telephone numbers and active internet data packages/WiFi networks available in the surrounding environment. Meanwhile, maintenance is carried out by village cadres who become program administrators to update information about stunting or other health information

as a form of program maintenance. For the calculation of costs at each stage and activity can be seen in table 2.

Table 2 Cost Analysis of the Hotline Stunting Program using WhatsApp Business Application in Balongcabe Village, Kedungadem District, Bojonegoro Regency

No	Cost Center	Activity	Needs Resources (Tools & Materials)	Costs	Unit Costs
1	Development	Discussion with village cadres about the needs in the program development process	Google meet	Rp -	Rp -
			Credit/internet data package	Rp. 10.000	Rp 10,000/GB
			Handphone (using existing cell phones)	Rp -	Rp -
		Download and activate WhatsApp Business app	Active phone number/prime card	Rp. 30.000	Rp 30,000/sim card
			WhatsApp Business App	Rp -	Rp -
		Download and login to WhatsApp Business app	Email	Rp -	Rp -
			Google Spreadsheet	Rp -	Rp -
		Input information related to stunting into Google Spreadsheets	Google Spreadsheet	Rp -	Rp -
			WhatsApp Business synchronization related to the information that has been inputted	WhatsApp Business App	Rp -
		Creation of application usage module and complementary food recipe module	Canva App and Google Document	Rp -	Rp -
			Printing of application usage module and complementary food recipe module	Print the application usage module	Rp. 48.000
		Branding poster and program leaflet creation	Print the complementary food recipe module	Rp. 34.000	Rp17,000/module
			Canva App	Rp -	Rp -
Printing of branding posters and program leaflets	Branding posters printing	Rp. 30.000	Rp 5,000/poster		
	Leaflet printing	Rp. 8.000	Rp 160/sheet		
2	Trial	Program trial with village cadres	Google meet	Rp -	Rp -
			WhatsApp Business App	Rp -	Rp -
			Credit/internet data package	Rp. 10.000	Rp 10,000/GB
		Socialization and training of village cadres related to the program	Google meet	Rp -	Rp -
			WhatsApp Business App	Rp -	Rp -
			Credit/internet data package	Rp. 10.000	Rp 10,000/GB
Launch	Delivery of program modules, posters and leaflets	Accommodation (fuel)	Rp. 30.000	Rp 10,000/liter	
3	a. Usage	Program operation	WhatsApp Business App	Rp -	Rp -
			Google Spreadsheet	Rp -	Rp -
			Email	Rp -	Rp -
			Credit/internet data package	Rp. 10.000	Rp 10,000/GB
			Google Spreadsheet	Rp -	Rp -
b. Maintenance	Update information on stunting/other health problems	Google Spreadsheet	Rp -	Rp -	

that occur							
Re-synchronize information updates in WhatsApp Business	WhatsApp Business App	Rp	-	Rp	-		
Total Costs		Rp 220.000					

From table 2 above, it can be seen that in making the Hotline Stunting using the WhatsApp Business application starting from the development stage, trials to the launch of the program which includes the use and maintenance of the program by cadres as a whole costs Rp. 220,000. These costs are needed for the continuity and successful implementation of the stunting intervention program, which is in line with what Shobry (2017) stated that cost is an important resource that can affect the effectiveness of program implementation and is needed for operationalizing program implementation⁽¹³⁾. Therefore, costs are considered an important thing in implementing activities in organizations. From these costs, the effectiveness of the use of the program by mothers of toddlers in Balongcabe Village will be measured, namely by seeing how many mothers of toddlers accessed the Hotline Stunting during the trial month compared to the total number of toddlers in Balongcabe Village. The complete calculation can be seen in table 3 below.

Table 3. Effectiveness of Using the Hotline Stunting Program During July-August 2021 in Balongcabe Village, Kedungadem District, Bojonegoro Regency

No	Program	Mothers of toddlers who access the program application (1 month)	Number of Toddlers	Effectiveness of Program Usage
1	Hotline Stunting (Stunting Intervention using WhatsApp Business Application)	73	144	51%

From table 3, it can be seen that the calculation of the effectiveness of using the Hotline Stunting program using the WhatsApp Business application by mothers of toddlers is 51%, which means that the use of the Hotline Stunting program is considered quite effective by Balongcabe Village village cadres to convey information and services related to stunting. In line with research conducted by Andarwulan, et al (2020) that the importance of the role of village cadres in providing information on the use of applications that can help mothers of toddlers understand about stunting during child development (14). The hope is that mothers of toddlers can change their behavior by paying more attention to the condition of their children during their growth and development. Based on this, a Cost Effectiveness Analysis calculation was then carried out to determine and measure the efficiency of the creation and use of the Hotline Stunting program by Balongcabe Village cadres. In this study, CER calculations and comparisons were not carried out because there was only one intervention carried out to prevent stunting in Balongcabe Village. For more details, the CEA calculation can be seen in table 4 below.

Table 4. Results of Cost Effectiveness Analysis (CEA) Calculation of Program Usage

No	Program	Total Costs	Effectiveness of Program Usage (%)	CEA Results
1	Hotline Stunting	Rp 220.000	51	Rp 4.314

From table 4, it can be seen that the result of the CEA calculation of the use of the Balongcabe Village Hotline Stunting program is 4,314 rupiah. This indicates that the Hotline Stunting Program using the WhatsApp Business Application with a low amount is effective as one of the stunting prevention programs and based on calculations with the USE Questionnaire is categorized as a program that is very feasible and easy to use, so it can be recommended to continue to be developed

in Balongcabe Village by village cadres. This is in line with research conducted by Refasi, et al (2018) that the smaller the results of the CEA calculation, the more effective and cheaper a program or other alternative is considered (15). Therefore, a program can be used as a recommendation for program options that can be implemented.

Conclusion

Based on the results of this study, it can be seen that the Hotline Stunting program that utilizes the automatic message feature on the WhatsApp Business application with the results of the CEA calculation of 4,314 rupiah and the USE Questionnaire calculation of 85.43%. This indicates that the Hotline Stunting Program with a low number is effective as one of the stunting prevention programs and is categorized as a program that is very feasible and easy to use, so it can be recommended to continue to be developed in Balongcabe Village.

This shows that the stunting intervention in Balongcabe Village strives to be sustainable in helping to prevent an increase in the prevalence of stunting in toddlers with information obtained only from home.

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